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ABSTRACT

Undertaken to determine reasons for the lack of success experienced by suppliers of scientific and technical information (STI) services in the promotion of their services to users, this study has identified the attitudes, settings, functions, needs and perceptions of the user audiences. A user panel, selected to interact with the education and marketing experts of such STI suppliers as Chemical Abstracts and Engineering Index, confirmed the original premise for the study, added the resolution of supplier images as a goal, and expanded the concept to include examination of communication channels as well as the educational promotional media. The panel discovered five user audiences, each with its own peculiar needs and interests: policy managers, technical managers, practitioners, intermediaries, and teachers. Major findings indicate that information is not perceived as a direct research tool by four of these five audiences, that the goals of suppliers are not clearly understood by users, and the degree of STI perception varies widely among the five audiences. Desired results based on these three basic situations are specified for each audience served and categories of educational approaches to STI are outlined, with suggestions for planning educational programs for STI and evaluating the results. (RAA)

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TECHNICAL REPORT

MEDIA SELECTION FOR INFORMATION USER TRAINING

NSF GRANT NO. DSI 175-19613 A02

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INTRODUCTION

This study was undertaken in order to investigate a problem noted by a number of scientific and technical information (STI) suppliers; namely that educational techniques used to promote and motivate the use of STI by a variety of audiences were not successful, despite the belief that the proper awareness and employment of STI services and resources could improve informed scientific and technical decision making.

Our investigations were directed toward the education of STI users in the broadest sense. The employment of educational techniques in a communication sense was considered fundamental to the achievement of STI user awareness and motivation. This distinction is important. Where education informs and trains, education as a communication process is more active. It begins with the stimulation of awareness, emphasizes value, and creates demand. The use of media as educational tools was considered a viable means of accomplishing these objectives in a cost effective manner.

We recognized that our resources were limited and that the educational programs themselves could not be developed, distributed and evaluated under this grant. We believe however, that we have made a determination of the attitudes, settings, functions, needs and perceptions of the user audiences and that we can determine the communication channels and media characteristics to be employed in subsequent work.

In an important sense we found that a major task for the study was self-educational. The user panel selected to interact with the education and marketing experts of the supplier group, quickly brought us to a realization that the attitudes of the audiences with respect to STI were even more amorphous and ambiguous than we had expected. Supplier motivations were suspect and the supplier educational role was poorly defined. While this confirmed our original estimate and perception of the need for responsive educational programs, the degree of that need was sharply increased. Resolution of supplier images became an added goal for the study and one that had to be immediately realized.

As a result of the dialog that developed concerning information supplier images and those of their services, a second goal was evolved. While our major interest was concerned with media, (in a more or less physical sense) the perceptions of the panel required that we expand our concept to include communication channels.

In order to do this we stressed the acquisition of solid information about who the users actually are, their STI attitudes, backgrounds, motives, priorities, needs and identifications.

Although the supplier organizations participating in this study are U. S. based, the problem of education for STI users, is a worldwide one. As science is international, so are its generators and consumers, and the pressing needs of the underdeveloped countries can be responsive to STI services delivered both in sophisticated and unsophisticated systems.

During the period in which we have worked, the institutions and individuals concerned with scientific and technical information have experienced a number of events of great importance and impact. Economic, social and even political factors have emerged that sharply focus many of the needs and problems. The atmosphere in which both users and suppliers are operating has grown more active and urgent.

Among the newly emerging factors we see for the first time a massive price reduction in on-line services (Lockheed and BRS), the formation of an on-line users cooperative in the U.S. and the multi-faceted Euronet developments.

Pressure for effective user education grows daily and rumblings of discontent are heard concerning the lack of definition in educational programs, the impossibilities of sending staff to separate educational programs for each data base and the direct and indirect costs that are involved.

For some audiences all is silence. Pplicy and technical managers, educators and practitioners still remain "outside the fold" and the luxury of underutilization of STI continues.

While our original concept considered that there were four (4) user "audiences", we expanded this to five (5) as a result of discussions with the user panel. This fifth segment, the "policy manager" opens a higher level to educational approaches. The incorporation of STI at the policy level introduces areas for educational efforts involving legislation and national science policies. While the programs we have developed include approaches to the scientific and technical disciplines through societies and institutions, the subject of STI education in this larger "world" becomes a problem for science and not just those who are active in preparing information products and services.

Still a beginning must be made. While we have carefully considered methods of obtaining educational involvement from a variety of science organizations, the role of the information supplier groups provides an operating means for important experiments. Despite the muddy image of supplier interests that we detected, the situation that presently exists encourages the audiences to look to these organizations for educational leadership. As marketers of services, both the public and private sectors of the information suppliers have long known that they must address a variety of sales targets. These targets have included all of the "audiences" to a greater or lesser degree and the long continuity of the suppliers has identified them with an educational role.

While it is in the interest of all participants in STI generation and use to promote the use of these services, the suppliers self-interest in improving sales puts them in a unique position and provides them with an important motivation. The programs suggested rely on both this service and financial motivation to accomplish useful educational programs.

II. FINDINGS

A. Audiences in General

In the Preliminary and Interim reports provided to the Foundation we have given a narrative description of the dialog that developed between the User Panel and the Supplier Team. While individual members of both Panel and Team may dissent from a particular finding, we were careful to review all findings (either in writing or at a subsequent meeting) so that a consensus was achieved.

B. Audiences - Original and Final

The Audiences were originally proposed as being four in number. This proposition was made by the Team and included Managers of research establishments, Intermediaries, a group of service oriented information personnel who act as an interface between a variety of users and the information, Teachers comprising all educational levels engaged in the training of scientific and technical personnel, and Practitioners representing scientists and technicians actively engaged in the performance of research.

The groups were left intact by the panel with the exception of the Managers. In this case it was agreed that there were two distinct types, Policy Managers and Technical Managers. Sufficient differences in attitude, motivation and the channels through which STI messages are transmitted for the two groups provided the distinction.

C. Audience Mobility

Audience mobility was found to be a factor for communication and education in STI. While the Intermediary audience tends to remain relatively fixed, it was found that Teachers could (and do) function as Practitioners or Technical Managers; Policy Managers often act as Technical Managers and even Practitioners etc. This changeability in role and function causes difficulties in isolating educational programs for one audience or another, and suggests an educational continuum.

D. Audience/Information Supplier Relationships

Audience/Information Supplier Relationships were found to be indistinct. The causes of this "blurring" differed with the audience polled. Intermediaries who were most familiar with the supplier organizations indicated some suspicion about the motives of the suppliers in perfonming an educational role. Policy and Technical Managers varied in their

knowledge of suppliers and their organizations, their problem seemed to lie in understanding why suppliers should interact directly with people in their positions. This willingness to be buffered from direct contact (frequently employing intermediaries as the buffer) is a source of special concern. In the case of Teachers, the infrequency with which this group uses information services contributed to a lack of definition concerning the suppliers.

Whatever the cause, the perception of information suppliers as a part of the "research team" is in need of attention.

III. Conclusions

As a result of this study, we have gained deeper insights into the problems confronting both the audiences for scientific and technical information and those who are attempting educational programs as a means of solving those problems. While our original concept of the employment of media as an end product retains validity, our understanding of the complex motivations and attitudes has grown so that the ways in which the media are used and their content will be improved for the future.

A. The STI Education Problem

Perhaps the most important result of our work has been our own education. As suppliers of STI, we have been disabused of some cherished delusions concerning the nature of the environment in which we work. We have come to a position from which the magnitude of our job can be seen and to an understanding of how to do it. These insights and understandings can be summarized as follows:

1) INFORMATION IS NOT PERCEIVED AS A DIRECT RESEARCH TOOL BY FOUR OF THE FIVE GENERAL AUDIENCES STUDIED.

2) THE ROLES, INTERESTS, IDENTITIES, CAPABILITIES AND OBJECTIVES OF THE INFORMATION SUPPLIERS ARE NOT CLEARLY UNDERSTOOD BY THE FIVE AUDIENCES. IN SOME CASES, THIS LACK OF UNDERSTANDING CREATES AN ADVERSARY ATMOSPHERE.

These major considerations translate into specific elements including:

3) THE DEGREE OF STI PERCEPTION VARIES AMONG THE FIVE AUDIENCES. THERE IS LESS IMPACT ON THE BEHAVIOR OF MANAGERS PARTICULARLY IN THE POLICY AREA AND CONSIDERABLY LESS UPON PRACTITIONERS. YET THE AUDIENCES REPRESENT AN OPERATING CONINUUM - STUDENT TO PRACTITIONER-TO-MANAGER WITH EDUCATORS AND INTERMEDIARIES MAINTAINING CONTACT WITH VARYING EMPHASIS.

B. The STI Education Goals by Audience

From these three basic situations we have the crux of the problem. We must now address what are the results that we want to attain. Audience by audience, these are:

1. Policy Manager

We would like the policy manager to understand the basic role of information in his business, and regard information as a primary resource. We want him to become a more informed buyer. If we achieve this, the manager is likely to weigh both the purchase and application of information with a more sophisticated scrutiny and regard it as a continuing investment rather than a necessary overhead.

2. Technical Manager

We would like the technical manager to become an advocate for the use of information resources; communicating this role to policy management, pressing for effective utilization in the practitioners activities.

3. Practitioner

We want the scientist and engineer to regard information retrieval and use as an indispensible part of his activity.

4. Intermediary

We want the intermediary to function more effectively as a change agent. This requires both an increased awareness of the orientation, interests and differing motivations of the three groups discussed above and a greater skill in communicating with them.

5. Teacher

We want the teacher of science and engineering courses to recognize the importance of information usage to the students' ultimate professional performance. If we can achieve this, retrieval and interpretation excercises should be incorporated as an integral and repeated part of science and engineering courses (rather than as an assumed skill or a separate "requirement").

In order to achieve these results as suppliers, we conclude:

1) IN ORDER TO COUNTER THE PERCEPTIONS AND ATTITUDES MENTIONED ABOVE WILL REQUIRE MORE THAN JUST THE DEVELOPMENT OF A VARIETY OF MEDIA.

2) STI EDUCATION REQUIRES A TOTAL "COMMUNICATION STRATEGY.

3) SUCH A STRATEGY MUST BE SUPPORTED BY SOME SOURCE OF "CREDENTIALS"* SUPPORTING STI AND THE SUPPLIERS.

4) SOURCES OF SUCH CREDENTIALS INVOLVE HIGHLY "VALUED" ORGANIZATIONS AND INSTITUTIONS FOR AUDIENCE INTERESTS.

5) THE SUPPLIERS ALSO REQUIRE "CREDENTIALS". AS WITH THE AUDIENCES THESE MUST BE HIGHLY "VALUED". BUT IN ADDITION, THE SUPPLIER ORGANIZATIONS MUST RESOLVE THE IMPRESSIONS OF DISARRAY THAT THEIR UNCOORDINATED ACTIVITIES CREATE.

6) SUCH CREDENTIALS MUST BE INCORPORATED IN MARKETING, PROMOTION AND EDUCATIONAL TECHNIQUES.

7) CREDENTIALS WILL NOT BE SUPPLIED FOR THE ASKING. THE SUPPLIERS MUST DEMONSTRATE EDUCATIONAL CAPABILITY TO SUPPORT THEIR CASE.

8) THE EDUCATIONAL DEMONSTRATIONS MUST BE APPLIED IN RECOGNITION OF EDUCATIONAL CRITERIA SPECIFIC TO STI AND THE STI AUDIENCES.

C. The Categories of Educational Approaches for STI

The supplier team and the user panel members used a "scenario" approach as a means of both developing dialog and projecting potential education programs for the five audiences. In addition to the specific plan that each scenario depicts, the content of these programs was analyzed in order to bring to light similarities that could be considered as general educational categories or criteria to be employed in creating programs for STI education.

These categories and criteria can comprise a check list to be applied not only to future work by the group performing this study, but to STI educational activities contemplated by others.

1. Multiple Role Capability

We have pointed out that the five audiences are engaged

* The credentials mentioned are a composite of identifications, images, active support measures, and nominal sponsorship which combine to enhance the perception of the groups to whom they are supplied.

in playing multiple roles at given times in their work or career development. While the degree of mobility varies somewhat, we can be sure that Policy Managers have often been Technical Managers, Practitioners and even Educators. Even the youngest of Practitioners may have some Technical Manager role in the present or in the future. The transference of roles can be noted to a greater or lesser degree in all of the five audiences. The cost benefits that can accrue if educational programs for STI recognize this variety of roles and functions are significant and important in designing these efforts.

2. Subject Matter Involvement

All of the groups concerned with STI (emphasis on the S and T) respond most directly when their subject benefits are projected. With this involvement with engineering, chemistry, biology rather than science as an abstract concept, educational programs should utilize specific subject matter and language in order to be identified with useful information.

3. Sponsors

If suppliers are to be major movers in the STI educational process, they must remedy the deficiencies in their images noted herein. This can be done in more than one way. If the suppliers can project utility by the improvement of their services, show themselves to be responsive to information needs etc., they will benefit directly in their relationships with the audiences. Given that such alterations in service take time and money, this approach must be reinforced. In the education area, such reinforcement could be gained by emphasizing supplier relationships with organizations that are already perceived of as useful to the audiences approached. Sponsorship by such organizations can provide subject matter involvement and strengthem supplier images.

4. Authority and Incentives

Educational techniques for STI have been notably lacking in this type of panoply. If suppliers can install their services with the trappings of value to the audiences through certification, awards and other procedures, the real values will be more noticeable.

5. Feedback/Outcome

Insofar as possible the education programs for STI should feature the analysis of survey data and other forms of user evaluation. Such program feedback should be installed as part of the original designs and the results should be used in adjusting present programs and planning others in the future.

6. Procedures

The procedures used in STI education (channels, media, etc.) must be matched to the known patterns and levels of acceptance for the specific audiences to be reached. Those conducting the programs must avoid the trap of using what is convenient or cheap in preference to those methods that are acceptable and valued.

D. Applying Education for STI and Evaluating Results

Finally, in developing such a communication program, the suppliers must recognize that all of the results we desire assume that information services are indeed a valuable and basic resource for research. The use of educational approaches to instill an appreciation of these services is valid, and if the lessons learned from this study are incorporated, can provide significant impetus for their use.

While there may be drawbacks to suppliers in taking the lead in education for STI, we have not uncovered another candidate group who has as much to gain, as much potential for understanding user motives, and a structure equipped to mount such efforts.

We all want to be loved. It is not unreasonable therefore for suppliers of STI services to be shocked when they hear some of the reactions they stimulate in the audiences whose respect they much desire. Possibly this rejection has resulted in the low profile maintained by suppliers in the educational approaches to many of the audiences. The handy antidote for these feelings lies in the economic consequences for a technological society that underutilizes the research resource that is STI are even more negative.

It has been all too easy for suppliers to emphasize their relationships with the people who buy their services, but as we have seen, the information using community is a continuum and relationships employing educational tools must be developed along that continuum.

Now that economic pressures in world information markets are focusing greater attention on secondary information suppliers in consequence of the deteriorating position of primary publications, users are in a state where they are looking to secondary services with a new awareness. This is generating the pressure that the suppliers involved in this study have sensed as requiring an education (or possibly a re-education) campaign.

Like other research and development investments, the education programs for STI that this study promotes will not offer magic solutions, but as with the research process it serves, STI education conducted along the lines suggested here can provide for some immediate needs and offer long range potential.

ACKNOWLEDGEMENTS

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